

REMARKS

Applicant respectfully requests reconsideration of this application as amended.

As a preliminary matter, in the Office Action mailed November 10, 2003, the Examiner did not attach an initialed copy of the PTO-1449 form references that were mailed to the PTO on February 15, 2002 and April 24, 2003. As such, applicant respectfully requests that the Examiner indicate that these references have been considered and made of record.

Office Action Rejections Summary

Claims 1-50 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,825,032 of Nonaka ("Nonaka") in view of U.S. Patent No. 5,548,123 of Perez-Mendez ("Perez-Mendez"), and in further view of U.S. Patent No. 6,171,643 of Polischuk ("Polischuk"), and in still further view of U.S. Patent Pub. No. 2003/0015665 of Suzuki ("Suzuki").

Status of Claims

Claims 1-20, 22-31 and 33-52 are pending in the application. Claims 1, 2, 4, 7, 8, 9, 22-25, 33-40, 44-48 and 50 have been amended to more properly define the invention. The amended claims are supported by the specification. Claims 51-52 have been added. No new matter has been added. Claims 21 and 32 have been canceled.

Claim Rejections

Claims 1-9 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Nonaka in view of Perez-Mendez, and in further view of Polischuk, and in still further view of Suzuki. Applicant submits that claim 1 is patentable over the cited references.

As amended claim 1 recites:

A digital radiography imager, comprising:
a **single** energy detection layer; and
an x-ray converting layer disposed above the single energy detection layer,
wherein the single energy detection layer is coupled to receive light from the x-ray
converting layer, wherein the x-ray converting layer has a first surface adjacent to
the single energy detection layer and a second surface on an opposite side to the
single energy detection layer and wherein the digital radiography imager is
configured such that **x-rays traverse the single energy detection layer before
propagating through the x-ray converting layer.**

(emphasis added)

Nonaka teaches an information combining unit for forming a combined image by
combining two pieces of radiation image information respectively obtained by first and
second radiation detection units 24 and 27. The radiation detection units 24 and 27 each
have solid-state light detection means. The light collect and converted into electrical
signals by units 24 and 27 are combined by image information combining means 28
(Nonaka, abstract and col. 6, lined 30-50; figure 7). As such, the radiographic apparatus
of Nonaka has two light detection units.

Nothing in Nonaka, either alone or in combination with the other cited references,
teaches or suggests a digital radiographic imager comprising a **single** energy detection
layer wherein the digital radiography imager is configured such that x-rays traverse the
single energy detection layer before propagating through the x-ray converting layer.
Moreover, one of ordinary skill in the art would not be motivated to modify the teachings
of Nonaka to arrive at such because Nonaka teaches away from the use a single light
detection unit through its object of solving the prior problem of generating **two** exposure
images without cross-over between the two.

In contrast, as amended claim 1 is directed to a digital radiographic imager
comprising a **single** energy detection layer wherein the digital radiography imager is
configured such that x-rays traverse the single energy detection layer before propagating

through the x-ray converting layer. Therefore, applicant submits that claim 1 is patentable over the cited references.

Given that claims 2-9 depend from claim 1, applicant submits that claims 2-9 are also patentable over the cited references.

Claims 10-20 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Nonaka in view of Perez-Mendez, and in further view of Polischuk, and in still further view of Suzuki. Applicant submits that claim 10 is patentable over the cited references.

Claim 10 recites:

A flat panel imager, comprising:
a photodiode layer;
a light transparent layer disposed above the photodiode layer; and
a scintillator layer disposed above the light transparent layer, wherein the scintillator layer has a first surface adjacent to the light transparent layer and a second surface on an opposite side of the light transparent layer, and wherein the flat panel imager is configured such that x-rays traverse the photodiode layer before propagating through the scintillator layer.

(emphasis added)

Applicant respectfully submits that the Office Action does not identify where Nonaka teaches the claim 10 limitation of “a light transparent layer disposed above the photodiode layer.” Moreover, applicant submits that layer 29 of Nonaka is a light shielding layer that is not transparent to light.

In contrast, claim 10 recites “a light transparent layer disposed above the photodiode layer.” Therefore, applicant submits that claim 10 is patentable over the cited references. If the Examiner purports that such is taught by the cited references, applicant respectfully requests the Examiner to particularly point out where (e.g., column and line numbers) in a reference the Examiner believes such may be found.

Given that claims 11-20 depend from claim 10, applicants submit that claims 11-20 are also patentable over the cited references.

For reasons similar to those given above with respect to claim 10, applicant submits that claims 27-31 are patentable over the cited references.

Claim 22 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Nonaka in view of Perez-Mendez, and in further view of Polischuk, and in still further view of Suzuki. Applicant submits that claim 22 is patentable over the cited references. Claim 22 has been amended to be written in independent format with all the limitations of its original base claim 21.

As amended claim 22 recites:

A flat panel imager, comprising:

a semiconductor layer disposed above a charge-collection layer; and
a bias electrode layer disposed above the semiconductor layer, the bias electrode to generate an electric field within the semiconductor layer, wherein the semiconductor layer has a first surface adjacent to the charge-collection layer and a second surface adjacent to the bias electrode, and wherein the flat panel imager is configured such that x-rays traverse the charge-collection layer before propagating through the semiconductor layer, **wherein electric charges drawn across the semiconductor layer is greater near the first surface of the semiconductor layer adjacent to the charge-collection layer relative to the second surface of the charge-collection layer.**

(emphasis added)

Applicant respectfully submits that the Office Action does not identify where the cited references teach the claim 22 limitation of “wherein electric charges drawn across the semiconductor layer is greater near the first surface of the semiconductor layer adjacent to the charge-collection layer relative to the second surface of the charge-collection layer.” Moreover, applicant submits that the charges in scintillators 22 and 26

are lower near its surface adjacent to light detection means 23 and 25, respectively, than near their adjoining surfaces (or the surfaces adjacent light shielding layer 29) of Nonaka.

In contrast, claim 22 recites “wherein electric charges drawn across the semiconductor layer is greater near the first surface of the semiconductor layer adjacent to the charge-collection layer relative to the second surface of the charge-collection layer.” Therefore, applicant submits that claim 22 is patentable over the cited references. If the Examiner purports that such is taught by the cited references, applicant respectfully requests the Examiner to particularly point out where (e.g., column and line numbers) in a reference the Examiner believes such may be found.

Given that claims 23-26 depend from claim 22, applicants submit that claims 23-26 are also patentable over the cited references.

Claim 36 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Nonaka in view of Perez-Mendez, and in further view of Polischuk, and in still further view of Suzuki. Applicant submits that claim 36 is patentable over the cited references. Claim 36 has been amended to be written in independent format with all the limitations of its original base claim 32.

As amended claim 36 recites:

A digital radiography system, comprising:
 an x-ray source to transmit x-rays;
 a flat panel imager to receive the x-rays and to produce a digitized image,
comprising:
 a semiconductor layer disposed above a charge-collection layer;
 and
 a bias electrode layer disposed above the semiconductor layer, the
 bias electrode to generate an electric field within the semiconductor layer;
 and
 **a casing that holds the flat panel imager together, wherein the
 casing forms an aperture window to receive the x-rays;**
 a display system connected to the flat panel imager, the display system to
display the digitized image, wherein the semiconductor layer has a first surface
adjacent to the charge-collection layer and a second surface adjacent to the bias

electrode, and wherein the flat panel imager is configured such that x-rays traverse the charge-collection layer before propagating through the semiconductor layer
(emphasis added)

Applicant respectfully submits that the Office Action does not identify where the cited references teach the claim 36 limitation of “a casing that holds the flat panel imager together, wherein the casing forms an aperture window to receive the x-rays.” Applicant submits that none of the cited references teach such a limitation. Therefore, applicant submits that claim 36 is patentable over the cited references. If the Examiner purports that such is taught by the cited references, applicant respectfully requests the Examiner to particularly point out where (e.g., column and line numbers) in a reference the Examiner believes such may be found.

Given that claims 33-35 depend from claim 36, applicants submit that claims 33-35 are also patentable over the cited references.

Claim 37 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Nonaka in view of Perez-Mendez, and in further view of Polischuk, and in still further view of Suzuki. Applicant submits that claim 37 is patentable over the cited references. As amended claim 37 recites:

An imaging method, comprising:
transmitting x-rays through a **single** photosensitive device layer; and
receiving the x-rays incident on a scintillator layer after the **transmission through the single photosensitive device layer.**

(emphasis added)

Nonaka teaches an imaging processing method for forming a combined image by combining two pieces of radiation image information respectively obtained by first and second radiation detection units 24 and 27. The radiation detection units 24 and 27 each have solid-state light detection means. The light collect and converted into electrical signals by units 24 and 27 are combined by image information combining means 28

(Nonaka, abstract and col. 6, lined 30-50; figure 7). As such, the imaging processing method of Nonaka transmits x-rays through two light detection units.

Nothing in Nonaka, either alone or in combination with the other cited references, teaches or suggests an imaging method comprising transmitting x-rays through a **single** photosensitive device layer; and receiving the x-rays incident on a scintillator layer after the **transmission through the single photosensitive device layer**. Moreover, one of ordinary skill in the art would not be motivated to modify the teachings of Nonaka to arrive at such because Nonaka teaches away from the use a single light detection unit through its object of solving the prior problem of generating **two** exposure images using two light detection units without cross-over between the two images

In contrast, as amended claim 37 is directed to an imaging method comprising transmitting x-rays through a **single** photosensitive device layer; and receiving the x-rays incident on a scintillator layer after the transmission through the single photosensitive device layer. Therefore, applicant submits that claim 37 is patentable over the cited references.

Given that claims 38-43 depend from claim 37, applicant submits that claims 38-43 are also patentable over the cited references.

Claim 44 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Nonaka in view of Perez-Mendez, and in further view of Polischuk, and in still further view of Suzuki. Applicant submits that claim 44 is patentable over the cited references. As amended claim 44 recites:

An imaging method, comprising:
transmitting x-rays through a **single** charge collection-layer; and
receiving the x-rays incident on a semiconductor layer after the
transmission through the single charge-collection layer.

(emphasis added)

Nonaka teaches an imaging processing method for forming a combined image by combining two pieces of radiation image information respectively obtained by first and second radiation detection units 24 and 27. The radiation detection units 24 and 27 each have solid-state light detection means. The light collect and converted into electrical signals by units 24 and 27 are combined by image information combining means 28 (Nonaka, abstract and col. 6, lined 30-50; figure 7). As such, imaging processing method of Nonaka transmits x-rays through two light detection units.

Nothing in Nonaka, either alone or in combination with the other cited references, teaches or suggests an imaging method comprising transmitting x-rays through a **single** charge collection-layer and receiving the x-rays incident on a semiconductor layer after the **transmission through the single charge-collection layer**. Moreover, one of ordinary skill in the art would not be motivated to modify the teachings of Nonaka to arrive at such because Nonaka teaches away from the use a single light detection unit through its object of solving the prior problem of generating **two** exposure images using two light detection units without cross-over between the two images.

In contrast, as amended claim 44 is directed to an imaging method comprising transmitting x-rays through a **single** charge collection-layer and receiving the x-rays incident on a semiconductor layer after the **transmission through the single charge-collection layer**. Therefore, applicant submits that claim 44 is patentable over the cited references.

Given that claims 45-50 depend from claim 44, applicant submits that claims 45-50 are also patentable over the cited references.

Applicant submits that new claim 51 is patentable over Nonaka.

Claim 51 recites:

A digital radiography imager, comprising:
an energy detection layer;

an x-ray converting layer coupled to the energy detection layer; and
a single energy detection/x-ray converting interface in the imager,
wherein the x-ray converting layer has a first surface adjacent to the energy
detection layer and a second surface on an opposite side to the energy detection
layer and wherein the digital radiography imager is configured such that x-rays
traverse the energy detection layer and the single energy detection/x-ray
converting interface before propagating through the x-ray converting layer.

(emphasis added)

Nonaka teaches an information combining unit for forming a combined image by
combining two pieces of radiation image information respectively obtained by first and
second radiation detection units 24 and 27. Each of the radiation detection units 24 and
27 has a scintillator coupled to a solid-state light detection means. In particular,
scintillator 22 is coupled to light detection means 23 forming a first interface
therebetween. Scintillator 26 is coupled to light detection means 25 forming a second
interface therebetween. (Nonaka, abstract and col. 6, lined 30-50; figure 7). As such, the
radiographic apparatus of Nonaka has two scintillator/light detecting means interfaces.

In contrast, claim 51 recites a digital radiographic imager comprising **a single**
energy detection/x-ray converting interface in the imager. Therefore, applicant submits
that claim 51 is patentable over Nonaka.

Applicant submits that new claim 52 is patentable over Nonaka.

Claim 52 recites:

A method, comprising:
receiving x-rays in a scintillator layer; and
transmitting x-rays through a photosensitive device **before** the x-rays are
received in **any scintillator layer**.

(emphasis added)

Nonaka teaches an information combining unit for forming a combined image by
combining two pieces of radiation image information respectively obtained by first and
second radiation detection units 24 and 27. Each of the radiation detection units 24 and

27 has a scintillator coupled to a solid-state light detection means. **X-rays are received first through scintillator 22 before being transmitted through either light detection means 23 or 25.** (Nonaka, abstract and col. 6, lined 30-50; figure 7).

In contrast, claim 52 recites a method transmitting x-rays through a photosensitive device before the x-rays are received in any scintillator layer. Therefore, applicant submits that claim 52 is patentable over Nonaka.

In conclusion, applicants respectfully submit that in view of the arguments and amendments set forth herein, the applicable rejections have been overcome.


If the Examiner believes a telephone interview would expedite the prosecution of this application, the Examiner is invited to contact Daniel Ovanezian at (408) 720-8300.

If there are any additional charges, please charge our Deposit Account No. 02-2666.

Respectfully submitted,

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